Successful Hair Transplant Outcome in Cicatricial Lichen Planus of the Scalp by Combining Scalp and Beard Hair Along With Platelet Rich Plasma

Dear Editor,

Hair transplant in scarring alopecia is challenging because of degenerative changes and reduced vascularity of scarred tissues. In addition, when scarring affects the safe donor area of the scalp, there is a lack of adequate number of grafts for appropriate coverage.

Surgical treatment of stable cicatricial alopecia includes hair transplantation primary excision of affected area, flap surgery, or scar reduction with tissue expansion.[1,2] In primary cicatricial alopecia due to inflammatory process such as lichen planopilaris, it needs to be ensured that the disease process has burned out before the transplant is attempted. It is generally recommended to wait at least 1 year till there are no signs of disease activity.[3] The choice of treatment method depends on the type of cicatricial alopecia as well as additional interdependent factors such as the availability of donor hair, scalp laxity, the patient's healing characteristics, vascular supply, and the location of the subsequent scar.[1,3]

Our patient was a 24-year-old male having inactive end-stage lichen planopilaris. The diagnosis of lichen planopilaris was made on the basis of lesion morphology and confirmed on histopathological examination [Figures 1 and 2]. The atrophic irregular patches of lichen planopilaris measuring from 2 mm to 5 cm in diameter were scattered discretely in the frontal, temporal, parietal, vertex, and occipital areas in the scalp, with intervening noninvolved scalp showing normal hair growth. The patient was off medication for the past 2 years with no change in the existing patches or appearance of fresh patches indicating lack of disease activity. Initially, a test patch of 50 grafts was harvested from the unaffected normal scalp in the occipital donor area zone using the follicular unit extraction (FUE) method and implanted into a patch of lichen planopilaris in the frontoparietal area [Figures 3 and 4]. One percent lignocaine without adrenaline was used for anesthesia in donor and recipient areas, normal saline without adrenaline were used for tumescence and motorized sharp punches of size 1 mm diameter were used. Stick-and-place method was utilized for graft implantation. Slits were made with a 18 Gauge

Figure 1: Case of lichen planopilaris showing multiple irregular well-defined atrophic patches of scarring alopecia involving the frontal, temporal, parietal, vertex as well as occipital areas

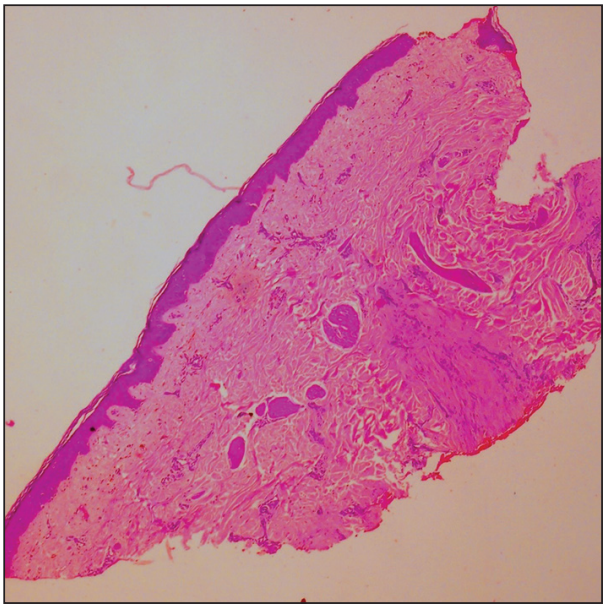


Figure 2: Biopsy showing sparse perivascular lymphocytic infiltrate with complete absence of hair follicles. The sites of former hair follicles are marked by the presence of linear zones of fibroplasia or arrector pilorum muscle. The papillary dermis shows delicate fibroplasia and melanophages. The epidermis shows numerous flattening of rete ridges. The upper dermis shows numerous melanophages, some of which extend along fibrous tracts. Findings were consistent with cicatricial alopecia due to follicular lichen planus

needle at a 45° angle. Before insertion of grafts, oozing of blood was visualized in order to ensure vascularity in the scarred tissue. Grafts were placed at 18 cm^2 density. Most of the harvested grafts were follicular units having multiple follicles. In the first sitting, only test patch was done. One mL of platelet rich plasma (PRP) was injected intradermally into the recipient area test patch just prior to graft implantation.

The PRP was made with using a two-step centrifugation process on benchtop centrifuge Remi model R4 at room temperature. The anticoagulant used was acid citrate A anticoagulant (ACD-A). 8.5 mL of whole blood was mixed with 1.5 mL of ACD-A anticoagulant to make 10 mL of anticoagulated whole blood per sterile centrifuge tube. Two-step centrifugation with a 15 min duration of each step, first at 200 g and second at 310 g forces were used for making PRP. A total of 5 mL of PRP from 50 mL of whole blood was made by this method. After the procedure, 80% of transplanted follicles showed optimum regrowth in the test patch [Figure 5].

After 10 months of the successful transplant result in the test patch, the remaining patches of scarring alopecia were covered by FUE hair grafts from the beard area and unaffected donor area on the scalp in a single session. At the time of the second transplantation, 5 mL of PRP was injected in all recipient patches.

A total number of 850 grafts were harvested for a second session, out of which 500 were harvested from occipital, parietal, and temporal areas and remaining 350 grafts were harvested from the beard [Figures 6 and 7]. Methodology, punch size, and

Figure 3: follicles harvested from unaffected occipital area of scalp

Figure 4: Test patch with 50 follicles harvested from scalp

Figure 5: Test patch showing hair growth of the harvested follicles after 3 months

Figure 6: Harvesting of follicles from the beard area (submandibular region)

anesthesia remained the same as used during test patch 10 months earlier. Follicular units having more than two hair follicles per graft were selected from the scalp, while the beard hair grafts had mostly single hair follicles. A total of 900 hair follicular units equaling approximately 1,800 hairs at a density of 18 FU/cm^2 were transplanted, inclusive of two sessions. After transplant, minoxidil 5% application, twice daily, was advised. Ten months after procedure, 80% of the transplanted grafts from the scalp as well as from the beard area survived and showed optimal growth, providing a reasonable cover in the alopecia patches [Figures 8-11]. Compared to the scalp hair follicles, the transplanted follicles from the beard area showed faster hair growth.

FUE method was preferred in this case for harvesting

Figure 7: Beard area after FUE

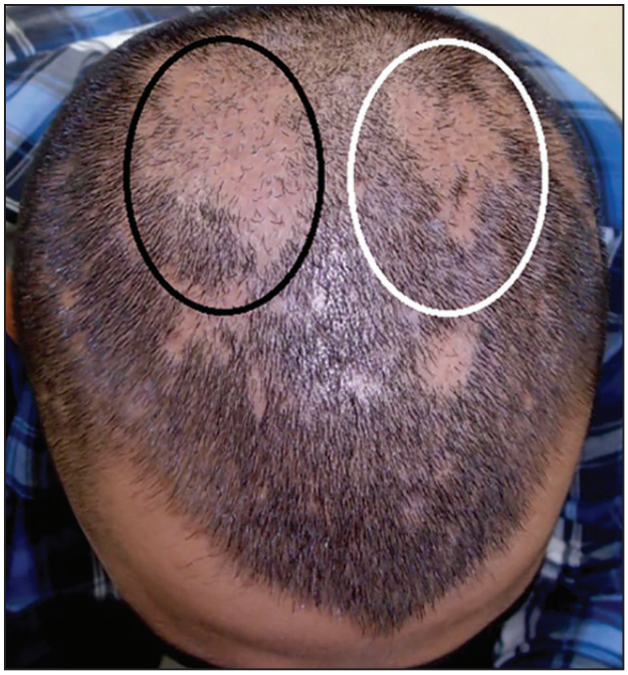
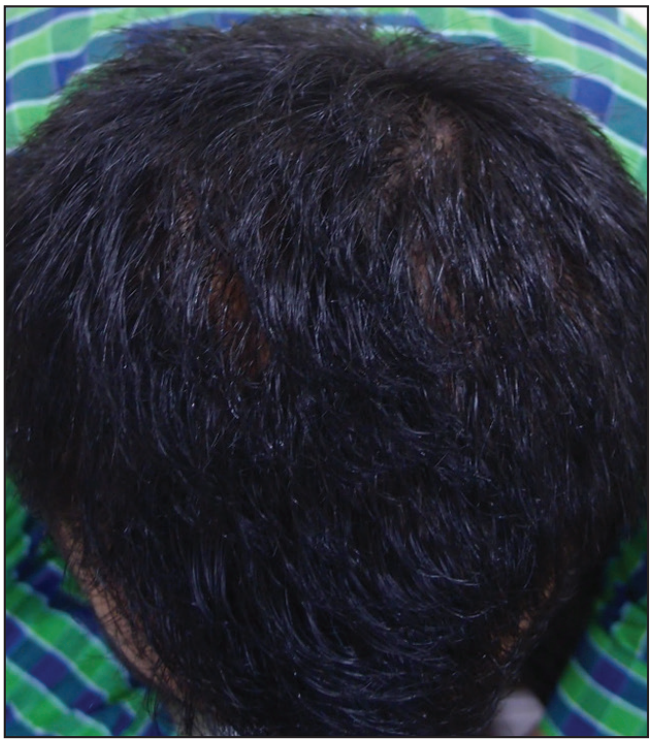


Figure 8: Month after second session scarring alopecia patches circled in black have follicles harvested from the scalp, while white circles showing follicles harvested from the beard area

Figures 9: Hair regrowth in scarred patches 10 months after second session of transplant. The grafts from the beard as well as scalp areas showing viable growth in scarred tissue providing reasonable coverage in cicatricial areas

Figures 10: Hair regrowth in scarred patches 10 months after second post 2nd session of transplant. The grafts from beard as well as scalp areas showing viable growth in scarred tissue providing reasonable coverage in cicatricial areas



Figures 11: Hair regrowth in scarred patches 10 months after second post 2nd session of transplant. The grafts from beard as well as scalp areas showing viable growth in scarred tissue providing reasonable coverage in cicatricial areas

because of the involvement of the cicatricial patches in the safe donor area on the scalp, as linear incision in such scarred donor area would have been problematic.[4] In addition, due to extensive involvement in frontal, temporal, vertex, and parietal areas, there was a lack of adequate donor grafts from the scalp and hence, after harvesting from a safe donor area, additional required grafts were harvested from the beard area using the FUE method. FUE method gives the added advantage of using body hair for transplant when donor area in the scalp is inadequate.[5]

Cicatricial alopecia patches are poor graft recipients because of reduced blood perfusion. The percentage of grafted follicles that survive depends in great measure on the blood supply of the vascular bed.[6] PRP is a rich source of anagen-maintaining factors, such as insulin-like growth factor 1 (IGF-1), basic fibroblast growth factor (bFGF), and vascular endothelial growth factor (VEGF). Injection of PRP has been demonstrated to improve cutaneous ischemic conditions and to increase vascular structures around hair follicles.[7] During a study using PRP during hair transplant in 20 male hair pattern baldness patients, Uebel *et al*. found a considerably significant effect of platelet growth factors on the yield of follicular units over non PRP used conventional hair transplants.[8]

One of the precautions to be taken into account when performing a hair transplant on scarred tissue is that the density in units/cm^2 must be less than on an area of normal scalp transplant (30-40 units/cm^2), because of the risk of follicles competing for the reduced blood flow through the scar tissue.[9] In this patient, lower than normal hair density of 18 units/cm^2 was utilized for transplanting hairs in the scarred patches.

About 80% of the transplanted follicles, harvested from both from the donor area in the scalp as well as the beard (body hair) displayed optimal survival and growth 10 months after procedure, providing a reasonable cover in the patches of cicatricial alopecia. Compared to the scalp hair follicles, the transplanted follicles from the beard area showed faster hair growth, consistent with shorter hair cycles in the beard area. Incidentally, it was observed that the quality of scarred tissue improved after transplant, as in the skin atrophy appeared to have reduced in the cicatricial patches. This can be possibly explained by the action of the PRP and additionally, the transplanted hair themselves cause neovascularization and dermal reorganization.[10]

Body hair from the beard areas can be used alone or in combination with donor hair from the scalp if there is widespread distribution of the cicatricial patches in the scalp producing a lack of adequate donor hair. The beard hair grafts have similar yields to grafts from the scalp and compare favorably with scalp hair in growth characteristics and can be considered a viable alternative for scalp hair in hair transplant procedures with paucity of donor grafts.

It is not possible to conclude by a single case report the efficacy of the PRP. The PRP with its action of tissue regeneration and remodeling with angiogenesis has the potential to revitalize the scarred tissue, improve its vascularity to make it more receptible for transplant and help increase the donor yield. Such PRP can serve as adjuvant to hair transplant in compromised recipient areas as seen in scarring alopecias and more studies should be undertaken to further explore its utility in combining it with hair transplant in cases of cicatricial alopecia.

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Conflicts of interest
There are no conflicts of interest.

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